CLAIMS

1. An EM transmitter (11) comprising a current source (not shown) and a dipole antenna (17), the dipole antenna (17) comprising a first electrode (18) mounted on a cable (19) and located near to the current source and a second electrode (21) mounted on a cable (22) and located further away from the current source, each electrode (18, 21) being electrically connected to the current source.

2. An EM transmitter as claimed in claim 1, characterised in that the electrodes (18, 21) are mounted on different cables.

3. An EM transmitter as claimed in claim 1 or claim 2, characterised in that the electrodes (18, 21) are spatially arranged on the corners of a triangle or the corners of a square.

4. An EM transmitter as claimed in claim 1 or claim 2, characterised in that there are two electrodes arranged in line.

5. An EM transmitter as claimed in any preceding claim, characterised in that the outer surface of the electrodes (18, 21) is formed from a non-corrosive metal.

6. An EM transmitter as claimed in claim 5, characterised in that the metal is copper or aluminium or platinum-plated titanium, or rhodium or magnesium.

7. An EM transmitter as claimed in any of claims 1 to 6, characterised in that the electrodes (18, 21) are tubular.

8. An EM transmitter as claimed in any of claims 1 to 6, characterised in that the electrodes (18, 21) are cylindrical.

9. An EM transmitter as claimed in any preceding claim, characterised in that the electrodes (18, 21) lie flush with the cable surface.

10. An EM transmitter as claimed in any preceding claim, characterised in that the surface of the electrodes is in the form of a grid.

11. An EM transmitter as claimed in any preceding claim, characterised in that the electrodes (18, 21) further comprise buoyancy elements to render the electrodes neutral buoyant.

12. An EM transmitter as claimed in any preceding claim, characterised in that the electrodes (18, 21) are between 1 m and 10 m in length.

13. An EM transmitter as claimed in claim 12, characterised in that the electrodes (18, 21) are between 4 m and 8 m in length.

14. An EM transmitter as claimed in claim 13, characterised in that the electrodes (18, 21) are 6 m in length.

15. An EM transmitter as claimed in any preceding claim, characterised in that the electrodes (18, 21) are spaced apart by a distance of between 100 m and 1000 m.

16. An EM transmitter as claimed in claim 15, characterised in that the electrodes (18, 21) are spaced apart by a distance of between 200 m and 500 m.

17. An EM transmitter as claimed in claim 16, characterised in that the electrodes (18, 21) are spaced apart by a distance of between 250 m and 300 m.

18. An EM transmitter as claimed in any preceding claim, characterised in that each cable (19, 22, 41) comprises a power conductor (43) and an electrically insulating outer sheath (42) and is connected to a body (15) containing the current source.

19. An EM transmitter as claimed in claim 18, characterised in that the power conductor (43) is in a braided annular form.

20. An EM transmitter as claimed in claim 19, characterised in that the electrically insulating outer sheath (42) is water-impermeable and chemically stable in sea water.

21. An EM transmitter as claimed in any preceding claim, characterised in that each cable (19, 22, 41) is sufficiently flexible to be wound on a storage drum.

22. An EM transmitter as claimed in any preceding claim, characterised in that each cable (19, 22, 41) further comprises either sensor wires (47) or optical fibres (48) or both.

23. An EM transmitter as claimed in any preceding claim, characterised in that each cable (19, 22, 41) further comprises depth transducers (23, 31) close to the electrodes (18, 21) and a temperature sensor and a further depth transducer (32) located at the halfway point of the cable.

24. An EM transmitter as claimed in any preceding claim, characterised in that each cable (19, 22, 41) comprises buoyancy elements (45) imparting slight buoyancy to towing depths of 3500 m.

25. An EM transmitter as claimed in any of claims 18 to 24, characterised in that each cable (19, 22) is continuous.

26. An EM transmitter as claimed in any of claims 18 to 24, characterised in that each cable (19, 22) comprises interconnected sections being between 50 m and 100 m in length, preferably 75 m.

27. An EM transmitter as claimed in any preceding claim, characterised in that the overall diameter of each cable (19, 22) is between 80 mm and 200 mm, preferably 120 mm.

28. An EM transmitter as claimed in any preceding claim, characterised in that each cable (19, 22) is arranged to generate a voltage sufficient to provide a current of 100 A to 10,000 A.

29. An EM transmitter as claimed in claim 28, characterised in that each cable (19, 22) is preferably arranged to generate a voltage sufficient to provide a current of 500 A to 2000 A.

30. An EM transmitter as claimed in claim 29, characterised in that each cable (19, 22) is preferably arranged to generate a voltage sufficient to provide a current of 1000 A.

31. An EM transmitter as claimed in any preceding claim, further including an acoustic positioning transponder trailed from the antenna.

32. An EM transmitter as claimed in any preceding claim, further including an EM immune databus system, by means of which sensor and command signals are communicated.

33. A method of EM surveying beneath the ocean floor using an EM transmitter (11) as claimed in any of claims 1 to 32, characterised in that the EM transmitter (11) is deployed on the ocean floor.

34. A method of EM surveying beneath the ocean floor using an EM transmitter (11) as claimed in any of claims 1 to 32, characterised in that the EM transmitter (11) is deployed by towing behind a vessel (14) as a cable or streamer.

35. A method of producing a survey report which comprises deploying a transmitter as claimed in any of claims 1 to 32, deploying one or more EM receivers; applying an EM wavefield to subsea strata using the EM transmitter; detecting the EM wavefield response using the EM receivers; analysing the EM wavefield response; and generating the survey report following the analysis.